

What is claimed is:

1. An ink jet recording apparatus comprising:

a recording head mounted on a carriage, the recording head being reciprocally movable in a width direction of a recording sheet; and

a sub-tank, for supplying, to the recording head, ink supplied from an ink cartridge, mounted on the carriage with the recording head, the sub-tank including,

an ink level detector, for detecting at least a low ink state in which quantity of ink stored in the sub-tank is smaller than a predetermined value, and a full ink state in which the quantity of ink stored in the sub-tank reaches the predetermined value, and

an ink consumption counter, for acquiring the total quantity of ink ejected or discharged by the recording head,

wherein, when the ink level detector detects the low ink state and the value acquired by the ink consumption counter reaches a predetermined count value, ink is supplied to the sub-tank by the ink cartridge.

2. The ink jet recording apparatus according to claim 1, wherein the predetermined count value stored in the ink consumption counter is set equal to or smaller than a value obtained by subtracting the quantity of ink to be ejected by the recording head during one cleaning operation from an

effective ink quantity in the sub-tank.

3. The ink jet recording apparatus according to claim 1, wherein

5 an ink supply valve is disposed along an ink supply path extending from the ink cartridge to the sub-tank, and

when the ink supply valve is opened, ink is supplied to the sub-tank.

10 4. The ink jet recording apparatus according to claim 1, wherein

The ink cartridge stores an ink pack composed of a flexible material in which ink is enclosed,

15 an outer block member of the ink cartridge is airtight, and

air compressed by an air compressor is applied to a space defined between the ink pack and the outer block member, and ink from the ink cartridge is supplied to the sub-tank under the compressed air.

20 5. The ink jet recording apparatus according to claim 4, wherein

the ink level detector is capable of detecting an overflow state in which the quantity of ink stored is greater than in the full ink state, and

when the overflow state is detected, an operation is performed for opening the ink supply valve and for releasing, to the atmosphere, the air compressed by the air compressor.

- 5 6. The ink jet recording apparatus according to claim 1, wherein the ink level detector for detecting the quantity of ink retained in the sub-tank includes:

a float member, which floats on ink that is supplied to the sub-tank;

10 a permanent magnet mounted on the float member; and
a magnetoelectric element for outputting an electrical signal in response to magnetic force generated by the permanent magnet according to a relative position of a float position of the float member and the magnetoelectric element.

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20 7. The ink jet recording apparatus according to claim 1, wherein the ink quantity counter obtains the quantity of ink consumed by performing a multiplication process using a coefficient based on the number of ink droplets ejected by the recording head, and by performing a multiplication process, using a coefficient, each time a cleaning operation is performed to suck and discharge ink from the recording head.

8. An ink supply method of controlling supply of ink to a
25 sub-tank of an ink jet recording apparatus which comprises

a recording head which is mounted on a carriage and is reciprocally moved across the width of a recording sheet, the sub-tank to which ink from an ink cartridge is supplied and from which ink is supplied to the recording head, an ink level detector for detecting the quantity of ink retained in the sub-tank, and a ink consumption counter for calculating, as a count value, total quantity of ink ejected or discharged by the recording head, the method comprising the steps of:

detecting the quantity of ink stored in the sub-tank by the ink level detector;

referring the count value acquired by the ink consumption counter and determined whether the referred value reaches a predetermined count value when a low ink state in which the quantity of ink stored in the sub-tank is smaller than a predetermined value; and

supplying ink from the ink cartridge to the sub-tank when the referred value reaches the predetermined count value.

9. The method according to claim 8, wherein

when the ink level detector detects, the detecting step, a full ink state in which the quantity of ink reaches the predetermined value, the ink supply halt operation for halting the supply of ink from the ink cartridge to the sub-tank is performed.

10. The method according to claim 9, wherein the count value stored in the ink consumption counter is reset when the ink supply halt operation.